

WHAT IS CLAIMED IS:

- 1 1. A computer implemented method for preparing a binding-ready biological
2 sample for a binding assay, comprising:
 - 3 receiving a binding assay design for a binding assay;
 - 4 preparing an experiment design for generating a binding-ready biological
5 sample to be used in said binding assay;
 - 6 optimizing materials usage and plate layout for generating said binding-ready
7 biological sample;
 - 8 choosing a robot method for generating said binding-ready biological sample;
 - 9 generating work instructions for generating said binding-ready biological
10 sample based on said binding assay design and said robot method; and
 - 11 transmitting the work instructions towards a controller for execution by robot
12 stations.
- 1 2. The method of claim 1, further comprising:
 - 2 determining from said robot method that pooling and splitting needs to occur;
 - 3 generating a worklist containing a set of instructions for pooling and splitting;
 - 4 and
 - 5 transmitting the worklist towards the controller for execution by the robot
6 stations.
- 1 3. The method of claim 1, further comprising:
 - 2 receiving UV spectrophotometer data for an at least partially prepared sample
3 of said binding-ready biological sample;
 - 4 determining which calculation to perform using said UV spectrophotometer
5 data, from said robot method;
 - 6 instructing a Laboratory Information Management System (LIMS) to perform
7 said calculation.

1 4. The method of claim 3, further comprising calculating a mass of said at least
2 partially prepared sample.

1 5. The method of claim 4, further comprising determining whether said mass of
2 said at least partially prepared sample is sufficient to perform said binding assay.

1 6. The method of claim 3, further comprising calculating fluorescent dye
2 incorporation for said at least partially prepared sample.

1 7. The method of claim 6, further comprising determining whether said
2 fluorescent dye incorporation is sufficient to perform said binding assay.

1 8. The method of claim 1, further comprising executing said work instructions on
2 robot stations to generate said binding-ready biological sample.

1 9. The method of claim 8, wherein said executing includes processes selected
2 from a group consisting of: converting; amplifying; purifying; dispensing;
3 quantifying; tagging; labeling; transferring reagents, enzymes, or other liquids;
4 pooling; splitting; and any combination of the aforementioned.

1 10. The method of claim 1, further comprising, before said generating, checking
2 inventory for materials required for said experiment design.

1 11. The method of claim 10, wherein said checking comprises:

2 sending a inventory request to an inventory system, where said inventory
3 request contains a list of materials required for said preparation;

4 receiving inventory data indicating whether said materials are available in
5 inventory; and

6 ascertaining from said inventory data whether said materials are available in
7 inventory.

1 12. The method of claim 10, wherein said checking comprises:

2 sending a inventory request to an inventory system;

3 receiving a list of all materials available in inventory;
4 ascertaining whether there are enough materials in inventory for said
5 experiment design.

1 13. The method of claim 1, wherein said binding-ready biological sample is a
2 hybridization-ready biological sample, and said binding assay is a hybridization assay.

1 14. A computer implemented method for preparing a binding-ready biological
2 sample for a binding assay, comprising:

3 receiving a binding assay design for a binding assay;

4 preparing an experiment design for generating a binding-ready biological
5 sample to be used in said binding assay;

6 choosing a robot method for generating said binding-ready biological sample;

7 generating work instructions for generating said binding-ready biological
8 sample based on said experiment design and said robot method; and

9 executing said work instructions on robot stations to generate the binding-
10 ready biological sample.

1 15. The method of claim 14, further comprising, before said generating,
2 optimizing materials usage and plate layout for generating said binding-ready
3 biological sample.

1 16. The method of claim 14, further comprising, before said generating, checking
2 inventory for materials required for said experiment design.

1 17. The method of claim 16, wherein said checking comprises:

2 sending a inventory request to an inventory system;

3 receiving a list of all materials available in inventory;

4 ascertaining whether there are enough materials in inventory for said
5 preparation.

- 1 18. The method of claim 16, wherein said checking comprises:
2 sending a inventory request to an inventory system, where said inventory
3 request contains a list of materials required for said preparation;
4 receiving inventory data indicating whether said materials are available in
5 inventory; and
6 ascertaining from said inventory data whether said materials are available in
7 inventory.
- 1 19. The method of claim 18, wherein said ascertaining comprises:
2 concluding that there are not enough materials in inventory for said
3 preparation;
4 notifying an operator that there are insufficient materials in inventory; and
5 repeating said ascertaining until there are enough materials in inventory for
6 said preparation.
- 1 20. The method of claim 14, wherein said receiving further comprises acquiring a
2 tissue sample.
- 1 21. The method of claim 20, further comprising, after said acquiring:
2 extracting a constituent sample from said tissue sample; and
3 updating inventory to include said constituent sample.
- 1 22. The method of claim 14, wherein said binding-ready biological sample is a
2 hybridization-ready biological sample, and said binding assay is a hybridization assay.
- 1 23. A system for preparing a binding-ready biological sample for a binding assay,
2 comprising:
3 multiple robot stations configured for preparation of a binding-ready
4 biological sample;
5 a controller for controlling said multiple robot stations; and

6 a experiment design manager that communicates with said multiple robot
7 stations, said experiment design manager comprising:
8 a data processor;
9 communications circuitry for communicating with said multiple robot
10 stations;
11 input and output devices;
12 at least one port coupled to said multiple robot stations; and
13 a memory, comprising:
14 instructions for receiving a binding assay design for a binding
15 assay;
16 instructions for preparing an experiment design for generating a
17 binding-ready biological sample to be used in said binding assay;
18 instructions for optimizing materials usage and plate layout for
19 generating said binding-ready biological sample;
20 instructions for choosing a robot method for generating said
21 binding-ready biological sample;
22 instructions for generating work instructions for generating said
23 binding-ready biological sample based on said experiment design and
24 said robot method; and
25 instructions for transmitting the work instructions towards said
26 controller for execution by said robot stations.

1 24. The system of claim 23, further comprising additional components selected
2 from a group consisting of: an inventory system, a Laboratory Information
3 Management System (LIMS), a database, an integration server, a serial splitter, a
4 scientist computer, and any combination of the aforementioned components.

1 25. The method of claim 23 wherein said binding-ready biological sample is a
2 hybridization-ready biological sample, and said binding assay is a hybridization assay.